'TRADER' SERVICE SHEET

# 232

# ALBA 540

## 640, 740 (A.C./D.C.)

TWO models of the Alba 540 receiver are made, one for A.C. mains and the other of the A.C./D.C. type. This *Service Sheet* was prepared on an A.C./D.C. 540, which is a 4-valve (plus rectifier) superhet with a barretter. It is suitable for mains of 190-250 V (40-60 C/S in the case of A.C.) and has provision for a gramophone pick-up, an extension speaker and for using the mains as an aerial.

An identical chassis is fitted in the 640 A.C./D.C. console receiver, while the 740 A.C./D.C. radio-gramophone and automatic radio-gramophone are very similar, the differences being dealt with under "Radiogram Modifications."

### CIRCUIT DESCRIPTION

Aerial input via **C1** and coils **L1, L2** to inductively coupled band-pass filter. Primary **L3, L4** is tuned by **C20**; secondary **L7, L8** by **C22**; coupling coils **L5, L6. C1** and **C2** isolate aerial and earth sockets respectively from the mains.

First valve (**V1, Mullard metallised FC13C**) is an octode operating as frequency changer with electron coupling. Oscillator grid coils **L9, L10** are tuned by **C24**; parallel trimming by **C25.** Tracking by shaped vanes and pre-set condenser **C26** (L.W.); anode reaction coils **L11, L12.**

Second valve (**V2, Mullard metallised VP13C**), a variable-mu R.F. pentode, operates as intermediate frequency amplifier with tuned-primary tuned-secondary transformer couplings **C27, L13, L14, C28** and **C29, L15, L16, C30.**

**Intermediate frequency 117·5 KC/S.**

Diode second detector is part of separate double diode valve (**V3, Mullard metallised 2D13C**). Audio frequency component in rectified output is developed across load resistance **R8** and passed via I.F. filter **C10, R7, C9,** coupling condenser **C11** and manual volume control **R9** to C.G. of pentode output valve (**V4, Mullard Pen36C**). Tone correction by fixed condenser **C15** in anode circuit. Provision for connection of gramophone pick-up across **R9** via isolating condenser **C12.** Provision for connection of high impedance external speaker across primary of internal speaker transformer **T1.**

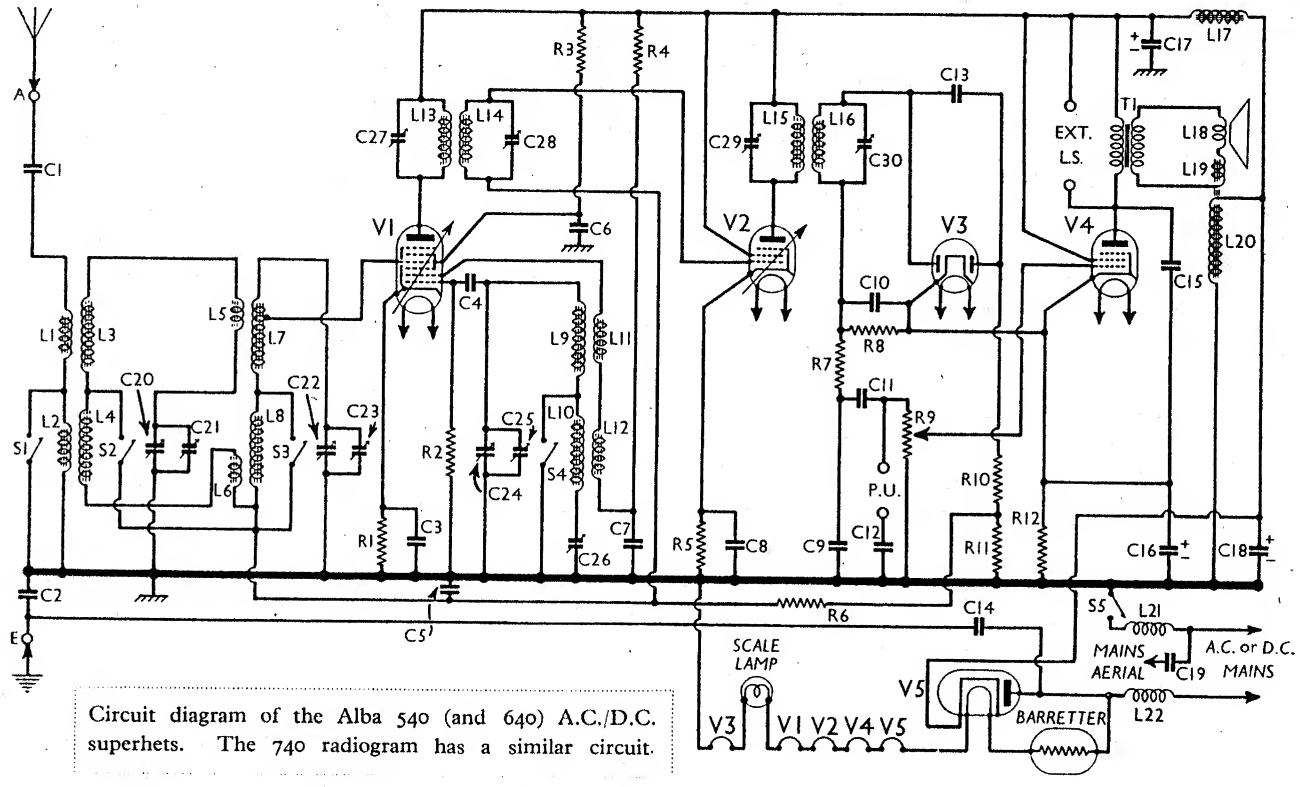
Second diode of **V3,** coupled by condenser **C13,** provides D.C. potential which is developed across load resistances **R10, R11** and fed back through decoupling circuits as G.B. to F.C. and I.F. valves, giving automatic volume control. Delay voltage is obtained from drop along **V4** cathode resistance **R12.**

When the receiver is used with A.C. mains, H.T. current is supplied by I.H.C. half-wave rectifier (**V5, Mullard UR1C**) which, with D.C. supplies, behaves as a low resistance. Smoothing is effected by iron-cored choke **L17** and dry electrolytic condensers **C17** and **C18.**

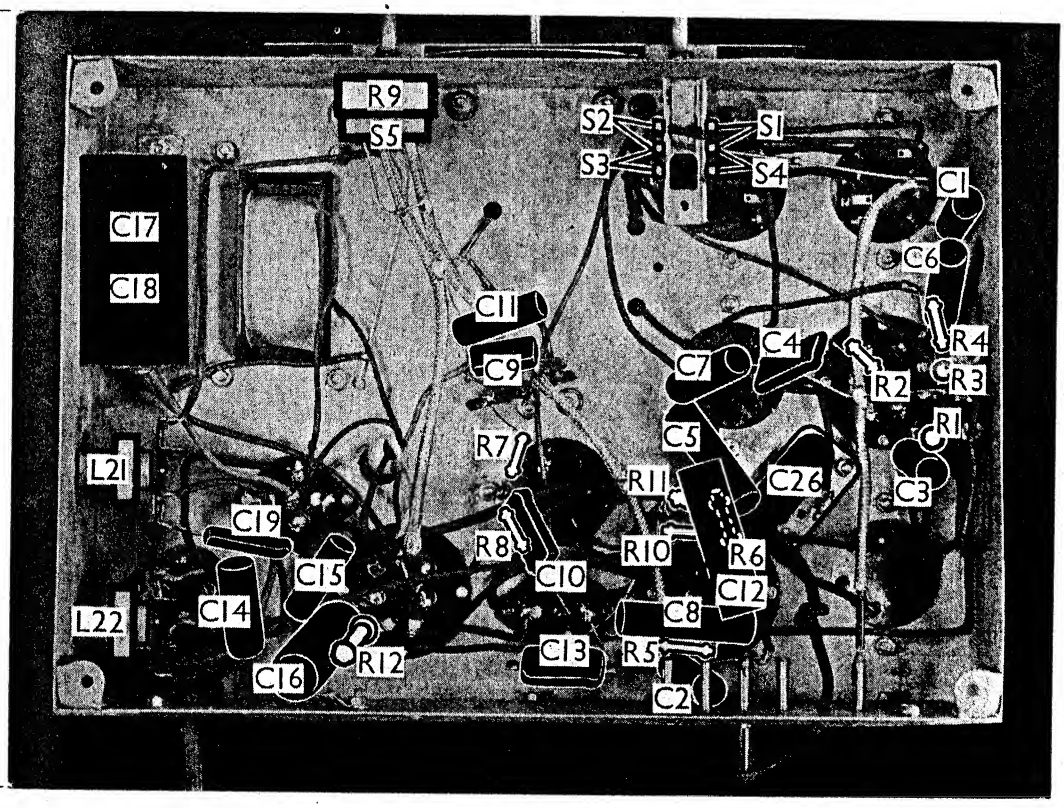
Valve heaters are connected in series, together with current regulating barretter (**Philips C1**) and scale lamp, across mains input. Filter comprising R.F. choke **L21, L22** and condenser **C14** suppresses mains-borne interference.

### COMPONENTS AND VALUES

| | RESISTANCES | Values (ohms) |
|---|---|---|
| R1 | V1 fixed G.B. .. .. .. | 200 |
| R2 | V1 osc. C.G. resistance .. | 50,000 |
| R3 | V1 S.G. H.T. feed .. .. | 50,000 |
| R4 | V1 osc. anode H.T. feed .. | 50,000 |
| R5 | V2 fixed G.B. .. .. .. | 150 |
| R6 | A.V.C. line decoupling .. | 1,000,000 |
| R7 | I.F. stopper .. .. .. | 50,000 |
| R8 | V3 signal diode load .. | 500,000 |
| R9 | Manual volume control .. | 500,000 |
| R10 | V3 A.V.C. diode load | 300,000 |
| R11 | resistances .. .. | 200,000 |
| R12 | V4 G.B. resistance .. .. | 170 |




Circuit diagram of the Alba 540 (and 640) A.C./D.C. superhets. The 740 radiogram has a similar circuit.




Under-chassis view. The switches **S1-S4** are all clearly marked. In the radiogram model there are additional switches in this unit, which are mentioned on page VIII. **C26** is adjusted through a hole in the chassis deck.

| | CONDENSERS | Values (μF) |
|---|---|---|
| C1 | Aerial isolating condenser .. | 0·002 |
| C2 | Earth isolating condenser .. | 0·02 |
| C3 | V1 cathode by-pass .. .. | 0·1 |
| C4 | V1 osc. C.G. condenser .. | 0·00015 |
| C5 | A.V.C. line decoupling .. | 0·1 |
| C6 | V1 S.G. decoupling .. .. | 0·1 |
| C7 | V1 osc. anode decoupling .. | 0·1 |
| C8 | V2 cathode by-pass .. .. | 0·1 |
| C9, C10 | I.F. by-passes .. | 0·00015, 0·00015 |
| C11 | A.F. coupling to R9 .. | 0·005 |
| C12 | P.U. isolating condenser .. | 0·25 |
| C13 | Coupling to V3 A.V.C. diode.. | 0·00025 |
| C14 | Mains R.F. by-pass .. .. | 0·02 |
| C15 | Tone corrector .. .. | 0·01 |
| C16* | V4 cathode by-pass .. .. | 25·0 |
| C17*, C18* | H.T. smoothing .. | 12·0, 8·0 |
| C19 | Mains aerial coupling .. | 0·00025 |
| C20† | Band-pass primary tuning .. | — |
| C21‡ | Band-pass primary trimmer .. | — |
| C22† | Band-pass secondary tuning | — |
| C23‡ | Band-pass secondary trimmer | — |
| C24† | Oscillator circuit tuning .. | — |
| C25‡ | Oscillator circuit trimmer .. | — |
| C26‡ | Oscillator L.W. tracker .. | 0·0007 |
| C27‡ | 1st I.F. trans. pri. tuning .. | — |
| C28† | 1st I.F. trans. sec. tuning .. | — |
| C29‡ | 2nd I.F. trans. pri. tuning .. | — |
| C30‡ | 2nd I.F. trans. sec. tuning .. | — |

* Electrolytic. † Variable. ‡ Pre-set.

| | OTHER COMPONENTS | Approx. Values (ohms) |
|---|---|---|
| L1 | Aerial M.W. coupling coil .. | 25·0 |
| L2 | Aerial L.W. coupling coil .. | 28·0 |
| L3 | Band-pass M.W. primary coil | 1·5 |
| L4 | Band-pass L.W. primary coil | 9·0 |
| L5 | Band-pass M.W. coupling coil | 0·2 |
| L6 | Band-pass L.W. coupling coil | 1·0 |
| L7 | Band-pass M.W. secondary coil | 1·5 |
| L8 | Band-pass L.W. secondary coil | 9·0 |
| L9 | Osc. circuit M.W. tuning coil | 1·3 |
| L10 | Osc. circuit L.W. tuning coil.. | 7·0 |
| L11 | Osc. anode M.W. reaction .. | 1·2 |

| | OTHER COMPONENTS (*Continued*) | Approx. Values (ohms) |
|---|---|---|
| L12 | Oscillator anode L.W. reaction | 2·1 |
| L13 | 1st I.F. trans. Pri. .. | 37·0 |
| L14 | 1st I.F. trans. Sec. .. | 37·0 |
| L15 | 2nd I.F. trans. Pri. .. | 37·0 |
| L16 | 2nd I.F. trans. Sec. .. | 37·0 |
| L17 | H.T. smoothing choke .. | 260·0 |
| L18 | Speaker speech coil .. .. | 2·0 |
| L19 | Hum neutralising coil.. .. | 0·1 |
| L20 | Speaker field coil .. .. | 5,000·0 |
| L21, L22 | Mains filter chokes .. | 3·5, 3·5 |
| T1 | Speaker input trans. Pri. | 470·0 |
| | Speaker input trans. Sec... | 0·4 |
| S1-S4 | Waveband switches .. .. | — |
| S5 | Mains switch, ganged R9 .. | — |

## DISMANTLING THE SET

**Removing Chassis.**—To remove the chassis from the cabinet, remove the three control knobs (recessed grub screws), swivel the clips for the tuning dial out of the way, and remove the four bolts (with washers and rubber washers) holding the chassis to the bottom of the cabinet. The chassis can now be withdrawn to the extent of the speaker leads, which should be sufficient for normal purposes. *When replacing*, do not forget the rubber washers between the chassis and the bottom of the cabinet.

To free the chassis entirely, unsolder the speaker leads and *when replacing* connect them as follows:—F, blue and tinned copper earthing lead to speaker frame; 3, black; 1, white; F, red.

**Removing Speaker.**—If it is desired to remove the speaker from the cabinet, remove the nuts from the four screws holding it to the sub-baffle. *When replacing*, see that the transformer is on the right.

## VALVE ANALYSIS

Valve voltages and currents given in the table below are those measured in our receiver when it was operating on A.C. mains of 235 V. The receiver was tuned to the lowest wavelength on the medium band and the volume control was at maximum, but there was no signal input.

Voltages were measured on the 1,200 V scale of an Avometer, chassis being negative.

| Valve | Anode Voltage (V) | Anode Current (mA) | Screen Voltage (V) | Screen Current (mA) |
|---|---|---|---|---|
| V1 FC13C* | 205 | 1·2 | 70 | 2·9 |
| V2 VP13C | 205 | 11·3 | 205 | 4·1 |
| V3 2D13C | — | — | — | — |
| V4 Pen36C | 185 | 41·0 | 205 | 5·7 |
| V5 UR1C† | — | — | — | — |

* Oscillator anode 90 V, 2·5 mA.
† Cathode to chassis 225 V, D.C.

## GENERAL NOTES

**Switches.**—**S1-S4** are the waveband switches in a single unit beneath the chassis. The individual switches are clearly marked in our under-chassis view. All the switches are *closed* on the M.W. band and *open* on the L.W. band. Note that one contact of **S2** and **S3**, and one of **S1** and **S4** is common. The 740 radiogram has some extra switches, described under "Radiogram Modifications."

*Continued overleaf*

**ALBA 540**—*Continued*

**S5** is the Q.M.B. mains switch, ganged with the volume control **R9.**

**Coils.**—The band-pass and oscillator coils are in three screened units on the chassis deck, while the I.F. transformers **L13, L14** and **L15, L16** are in two further screened units, also on the chassis deck, provided with trimmers adjusted by concentric nuts and screws. The chokes **L21, L22** are beneath the chassis.

**Scale Lamp.**—This is an Osram M.E.S. type, rated at 6·2 V, 0·3 A.

**External Speaker.**—Two screw terminals on the internal speaker terminal panel are provided for the connection of an external high resistance speaker.

**Condenser C26.**—The oscillator L.W. tracker is adjusted through a hole in the chassis deck between the **V1** and **V2** valveholders.

**Condensers C17, C18.**—These are two dry electrolytics with a common negative (black) lead. The red lead is the positive of **C17** (12 $\mu$F) and the yellow the positive of **C18** (8$\mu$F).

## RADIO-GRAM MODIFICATIONS

Basically the 740 radio-gram has a circuit similar to the 540 table and 640 console models. There are, however, certain additions and modifications.

In the first place, instead of the pick-up sockets being in series with **C12** across **R9** as in our diagram (which, incidentally, necessitates the use of a pick-up with a fairly large output), one of them is connected to chassis and the other to one of the outer contacts of an extra single-pole changeover switch. The lead from **L14** to the junction of **C5** and **R6** is broken, and taken to the centre contact of the switch, the junction going to the third contact of the switch.

The lead from **L15** to the H.T. line is broken, and two resistances in series are inserted. That nearest **L15** is 5,000 O, and that nearest the H.T. line is 2,000 O. A condenser of 0·002 $\mu$F is connected from the top of **L15** to chassis, and another of 2 $\mu$F (electrolytic) is connected from the junction of the two extra resistances to chassis.

The lead from **C11** to **R7** is broken and taken to the centre contact of another S.P.C.O. switch. The junction of **R7** and **C9** is taken to one outer contact of this switch, while from the remaining outer contact a lead goes to the junction of **L15** and the 5,000 O extra resistance and 0·002 $\mu$F condenser.

A tone control circuit, consisting of a 0·05 $\mu$F fixed condenser and a 250,000 O variable resistance in series is connected across the primary of **T1.**

It will be seen that on radio the circuit is the same as in the table model, except for the extra resistances and condensers in the anode circuit of **V2,** (which provide a certain amount of decoupling), and the variable tone control.

On gramophone, **V2** is used as an R.C. amplifier, and the radio circuit is fully muted.

The extra switches are accommodated on the wave-change switch assembly, and a gramophone position is provided.

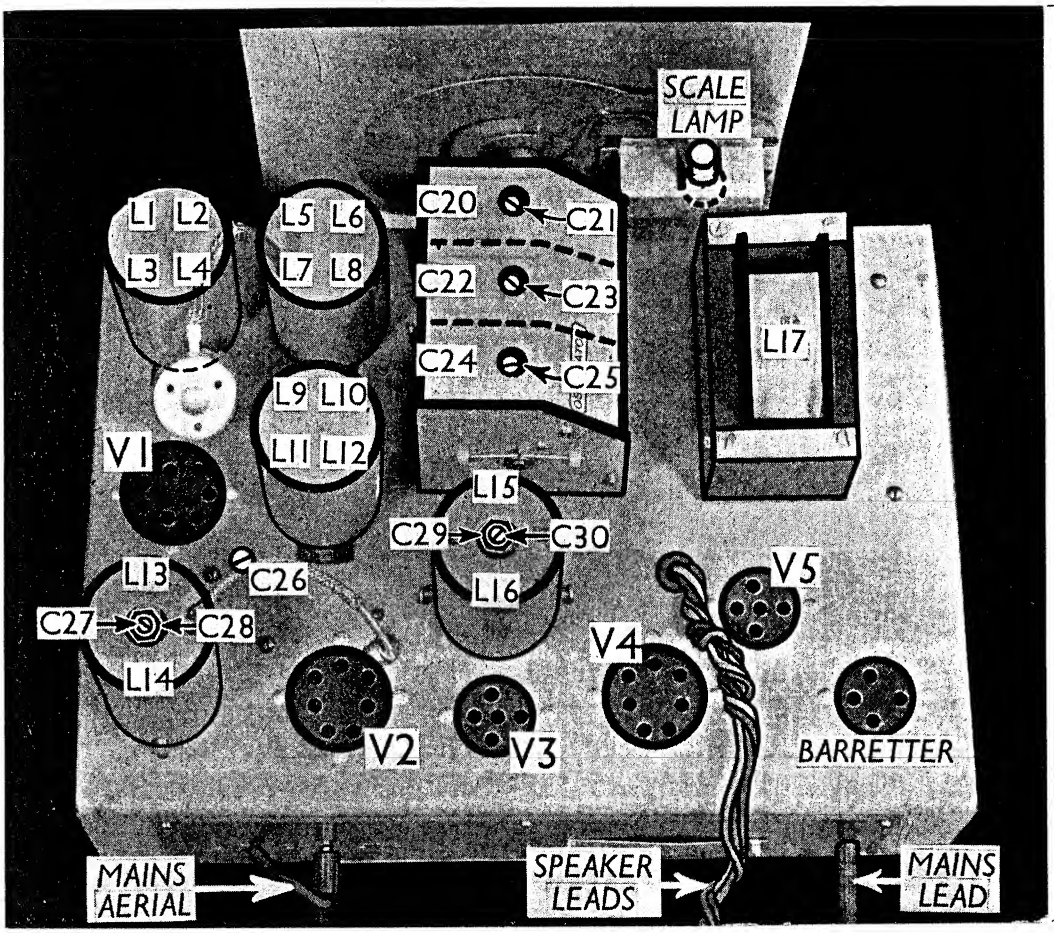
## CIRCUIT ALIGNMENT

Circuit alignment follows normal practice. The I.F. tranformers are first aligned at 117·5 KC/S, feeding the signal generator output between the top cap of **V1** and earth, and adjusting the trimmers **C27, C28, C29** and **C30** in turn for maximum output.

A signal of about 220 m. is now fed into the aerial and earth sockets, the scale pointer set to the same wavelength, and **C25** is adjusted.

If there are two peaks, the correct one is the second reached when unscrewing **C25** from maximum capacity. **C23** and **C21** are then adjusted for maximum output.

The set is then switched to the L.W. band, a signal of about 1,400 m. is injected, and tuned in. **C26** is then adjusted for maximum output, rocking the gang slightly if necessary to obtain the optimum setting.




Plan view of the chassis. Note the nut and screw adjusters for the I.F. trimmers **C27-C30. C26,** the long-wave tracker, is adjusted through a hole in the chassis deck. **L17** is the H.T. smoothing choke, the speaker field being across the H.T. supply.

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